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1977 Report of

RANDOM SAMPLE EGG PRODUCTION TESTS

United States and Canada

Two-Year Combined Summary, 1975-76 and 1976-77

Range Group Rankings, 1976-77

ARS-NE-21-5

February 1978

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PREFACE

Egg production tests are designed to provide poultrymen, hatcherymen, and breeders with a reliable guide to the performance of poultry stocks offered for sale. This publication contains information on many egg production traits that are of economic importance to the trade. The data were compiled from the records of official Random Sample Egg Production Tests conducted in the United States and Canada. The data resulting from these tests have been analyzed statistically by the Animal Improvement Programs Laboratory, Animal Physiology and Genetics Institute, Agricultural Research Service, USDA, Beltsville, Maryland.

The publication of this report is based on recommendations of the National Committee on Random Sample Poultry Testing and the Council of American Official Poultry Tests. The information was compiled by the Poultry Improvement Staff, Animal Improvement Programs Laboratory, Agricultural Research Service, from data furnished by Test supervisors.

The publication of this report does not imply approval or endorsement by the U.S. Department of Agriculture of any of the stocks mentioned.

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TABLES

1977 REPORT OF RANDOM SAMPLE EGG PRODUCTION TESTS, UNITED STATES AND CANADA

This report is divided into three sections:

1. A two-year combined summary of the data obtained in the 1975-76 and 1976-77 Random Sample Egg Production Tests. These data were treated by acceptable statistical procedures that allow the reader to compare directly the stock entered in the various egg production tests in the United States and Canada.

2. An explanation of statistical procedures that were used in computing the regressed means and confidence limits of egg production traits evaluated in the two-year combined summary.

3. A range group ranking for stock that was entered in 1976-77 Random Sample Egg Production Tests. The ranking shows the performance of each stock by traits compared with that of other stocks in the same test.

TWO-YEAR COMBINED SUMMARY FOR TEST YEARS 1975-76 AND 1976-77

Entries in the various tests start with a random sample of hatching eggs or chicks of the stock to be tested. Samples are drawn according to prescribed methods to ensure that each entry is typical of the stock it represents. All entries within a test are treated alike with respect to housing, feeding, management, and disease control in order to avoid differences in performance that would be due to environment.

All tests are conducted according to these basic principles. However, even the most carefully designed and conducted tests are influenced by errors of two kinds. The first kind of error is the chance deviation or unavoidable "sampling error" made when a small sample of eggs or chicks represents an entry. The other kind of error is due to uncontrolled or unknown environmental differences between entries that occur in spite of all efforts to treat all entries within a given test as nearly alike as possible. The differences between the results for two entries in a single test for a single year may be due to these chance variations rather than to a real difference in the performance capabilities of the two stocks. The effect of such errors in comparing stocks can be materially reduced by basing comparisons on the combined results of several tests over two or more years.

If all entries compared were entered in the same tests in both years, the simple averages could be compared directly without adjustment. However, differences among tests and between years and those caused by climatic conditions and other environmental factors affect the results. As a consequence, a direct comparison of the test results of two stocks in different tests or in different years may be misleading. Therefore, to present test results in a manner that will allow sound evaluation of all stocks tested, the results were combined by stocks and by years, and were adjusted by accepted statistical procedures for test and year differences and for variation in amount of information per stock. The results of these computations are published as the "regressed mean" for each trait for each stock that was tested (table 1).

The performance data (regressed means) reported in this summary are derived from the results reported by the individual tests for each of the past two years. It is unlikely, however, that the means for any stock, even though entered in only one test each year, will coincide precisely with the two-year average performance data as published by the test. The variations are due to adjustments for test differences, year difference, the number of tests and of years entered, and the number of replicates per test. These statistical adjustments allow predictions of what the average performance would have been for each stock had all stocks been entered in all tests each year.

The statistical treatment applied to the test data is designed to reduce the influence of nongenetic variations. This cannot be accomplished perfectly, and consequently, estimates or predictions of performance cannot be made with absolute precision. However, reliable predictions, within prescribed limitations, can be made as to whether a difference in the reported performance of stocks represents a real difference in their performance. These predictions involve the use of the confidence limit values that have been computed for each trait or performance factor reported.

A brief explanation of the statistical procedures used in computing the regressed means and confidence limits is provided in the section entitled "Procedures Used for Computing Combined Summary Values."

The following example illustrates the compilation of the two-year combined summary. This and the related explanation will help the reader to use and interpret the data in table 1.

(Illustration of regressed means and 80 percent confidence limits as they might appear for a few traits)

STOCK CODE	FEED PER POUND OF EGGS PRODUCED (pounds)		EGG WEIGHT (oz./doz.)		LARGE AND EXTRA LARGE EGGS (percent)		ALBUMEN QUALITY (Haugh units)		BLOOD SPOTS				BODY WEIGHT (pounds)	
									1/8 INCH OR MORE (percent)		LESS THAN 1/8 INCH (percent)			
	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS
		2.95		25.7		75.2		77.1		0.9		2.2		5.4
995	3.02	3.09	26.0	26.3	77.5	79.8	77.9	78.7	1.1	1.4	2.7	3.2	5.6	5.8
		2.77		25.0		69.0		80.1		.6		.8		4.0
996	2.83	2.89	25.2	25.4	71.0	72.8	80.9	81.7	.7	1.0	1.1	1.4	4.2	4.4
		2.86		24.6		65.5		73.3		1.0		1.5		4.5
997	2.94	3.02	24.9	25.2	68.0	70.3	74.1	74.9	1.2	1.4	1.9	2.4	4.7	4.9
		2.73		24.9		69.2		75.5		.9		1.2		3.7
998	2.84	2.95	25.3	25.7	72.4	75.6	76.6	77.7	1.0	1.2	1.5	1.9	4.0	4.3
		2.47		25.0		67.6		82.3		.6		.7		3.9
999	2.56	2.65	25.4	25.8	70.3	73.0	83.0	88.7	.8	1.0	1.1	1.4	4.2	4.5

*If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5% level.

The range of the confidence limits represents the amount of difference in the performance of two stocks that may be due to chance. If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5 percent level of probability. If the confidence limits for two regressed means do not overlap, the odds are at least 19 in 20 that a real difference exists in the performance of the two stocks.

The use of the above data as a means of evaluating different stocks and traits can be illustrated as follows:

For the trait "Body Weight," the confidence limits of Stock 995 (5.4 to 5.8 lbs.) do not overlap the confidence limits of any of the other stocks. Therefore, Stock 995 has a significantly higher body weight than the others. However, the confidence limits of Stock 996 (4.0 to 4.4 lbs.) overlap the confidence limits of Stock 998 (3.7 to 4.3 lbs.) and Stock 999 (3.9 to 4.5 lbs.). The body weights of these three stocks are, therefore, not significantly different.

Using the trait "Feed per Pound of Eggs Produced" as another example, the confidence limits of Stock 995 (2.95 to 3.09 lbs.), Stock 997 (2.86 to 3.02 lbs.), and Stock 998 (2.73 to 2.95 lbs.) all overlap each other. Thus there is no significant difference in the feed conversion of these three stocks. When comparing the feed conversion of Stock 999 (2.56 lbs.) with that of the other stocks, we see that the range of its confidence limits is from 2.47 to 2.65 lbs. Since this range does not overlap the confidence limits of the other four stocks, Stock 999 has a significantly lower feed conversion than the other stocks listed.

Another example can be shown by using the trait "Albumen Quality." The confidence limits of Stock 995 (77.1 to 78.7) overlap the confidence limits of Stock 998 (75.5 to 77.7). Therefore, there is no significant difference in the albumen quality of these two stocks, even though the regressed mean of Stock 995 is 77.9 Haugh Units and Stock 998 is 76.6 Haugh Units. When Stock 995 is compared with Stocks 996 and 999, we see that the confidence limits of these two stocks do not overlap those of Stock 995. Thus, these two stocks have a significantly higher albumen quality (80.9 and 83.0 Haugh Units, respectively) than the 77.9 Haugh Units of Stock 995. In comparing Stock 995 with Stock 997, the confidence limits do not overlap. In this case, the albumen quality of Stock 997, expressed as a regressed mean of 74.1 Haugh Units is significantly lower than the regressed mean of Stock 995.

The range of the confidence limits will not necessarily be the same for two different stocks that have the same regressed mean. The number of locations in which a stock is entered, the number of replicate pens per location, the number of years entered, and the accuracy involved in adjusting for location and year effects all have a bearing on the range of the confidence limits for each individual regressed mean.

Explanation of Income Figures

The "Income Over Feed and Chick Cost" figures reported in table 1 represent the sales value of the eggs produced and of the hens at the end of the test minus the cost of the chicks and the feed used during the growing and laying periods. These figures may be useful in comparing the overall performance of stocks, but they should not be considered as predictions of "profit" to be obtained under commercial operations. The "income" figures should be reduced by other costs, such as labor, building and equipment depreciation, vaccination, litter, interest, taxes, and insurance, to approximate profits that might be expected under commercial conditions. Surveys conducted among commercial producers indicate that such other costs may range from $1 to $2 per pullet housed.

Although the average chick price is reported for each stock, this value cannot be appropriately used to convert the "Income Over Feed and Chick Cost" figure to an income over feed cost figure. The average chick price shown is a simple unadjusted average of the prices reported by the entrant for his entries in the various tests and is not directly comparable to chick cost included in "Income Over Feed and Chick Cost."

Stocks Should be Compared for all Traits

All traits should be considered when using this report to evaluate the overall performance of the various stocks. The values reported for "Income Over Feed and Chick Cost" represent a composite of several traits combined as determined by the economic conditions of the areas in which the tests are located. The conditions under which the stock is expected to perform in commercial production may differ from those prevailing at the tests, and such differences should be taken into consideration. For example, a poultryman whose local market pays unusually high premiums for large and extra large eggs should place more emphasis on egg size in his evaluation of stock than poultrymen located in areas where such premiums are not available. The local market preference for brown or white shells should also be taken into account. Traits related to interior egg quality that affect the grade are of greatest importance in areas where prices are based on quality standards.

Each person should study his local needs and conditions and then place appropriate emphasis on the performance traits that are of greatest importance to his situation. A productive and profitable stock for one poultryman under one set of conditions may not fit the needs of another poultryman under a different set of conditions.

Definition of Terms Used and Abbreviations

Stock: A term used to identify a specific breeding combination of chickens. These breeding combinations may include pure strains, strain crosses, breed crosses, incrosses, or combinations thereof. Kinds of stock and breeding methods are:

BPR	Barred Plymouth Rock	SYN	Synthetic	IN	Incross
NH	New Hampshire	WL	White Leghorn	INX	Incrossbred
RIR	Rhode Island Red	WPR	White Plymouth Rock	PS	Pure Strain
RIW	Rhode Island White	BX	Crossbred	SX	Strain Cross

Tests:

Canada Central (CC)	New Hampshire Floor (NH-F)
Florida (FL)	North Carolina (NC)
New Hampshire Cage (NH-C)	Pennsylvania (PA)

Test Year: A period beginning during the first year stated in a double-year designation and ending approximately 500 days later.

Definition of Traits

Growing mortality — Percentage of birds that died on or before the time they were 150 days old or subsequent age at housing.

Laying mortality — Percentage of birds that died after they were 150 days old or subsequent age at housing.

Age at 50 percent production — Days of age computed from the first day of the first two consecutive days of 50 percent production for living birds in the entry at that time.

Hen-housed egg production — Number of eggs laid per pullet housed computed from time of housing to the end of the test.

Hen-day egg production (to end of test) — Percent hen-day production from the time birds reached 50 percent production to end of test.

Hen-day egg production (last 30 to 60 days) — Percent hen-day production during the last 30 to 60 days of the test. Length of time involved varies according to the record keeping system of each individual test.

Feed per pound of eggs — Pounds of feed per pound of eggs produced, computed from bulk weighing of the eggs at least one day every two weeks or two days a month at equal intervals during the laying period of the test.

Feed per 100 birds per day — Average pounds of feed consumed per day per 100 birds, calculated over the entire test period.

Egg weight — The weight of a dozen eggs computed from bulk weighing of the eggs at least one day every two weeks or two days a month during the laying period of the test.

Large and extra large eggs — Percentage of large and extra large eggs as determined by egg-size distribution computed from all eggs laid one day each week.

Albumen quality — Haugh units, computed from egg weight and albumen height of broken-out egg measured on one day's eggs per quarter, at equal intervals. The greater the Haugh units the higher the albumen quality.

Large blood spots — Percentage of eggs with one or more large blood spots (1/8 inch or more in diameter), computed from at least three days' eggs per quarter, broken-out basis.

Small blood spots — Percentage of eggs with one or more small blood spots (less than 1/8 inch in diameter), computed from at least three days' eggs per quarter, broken-out basis.

Large meat spots — Percentage of eggs with one or more colored large meat spots (1/8 inch or more in diameter), computed from at least three days' eggs per quarter, broken-out basis.

Small meat spots — Percentage of eggs with one or more colored small meat spots (less than 1/8 inch in diameter), computed from at least three days' egg per quarter, broken-out basis.

Specific gravity score — Eggs are given the specific gravity score that corresponds with the specific gravity of the solution in which they will float. Eggs that do not float in 1.100 solution are given a nine score. The specific gravity of an egg is closely correlated with shell thickness; therefore, the higher the specific gravity score, the thicker the shell. Tabulation of specific gravity solutions and the corresponding specific gravity scores follow:

Solution	Score	Solution	Score
1.068	0	1.088	5
1.072	1	1.092	6
1.076	2	1.096	7
1.080	3	1.100	8
1.084	4		

Body weight — Average weight of birds alive at end of test.

Income over feed and chick cost — Income over feed and chick cost per pullet housed, with chick cost in 1,000 lots at hatch date adjusted for mortality (accidental deaths, sexing errors, and missing chicks not included).

Canada Central Egg Production Test
A. H. Bentley, Poultry Production Section, Canada Department of Agriculture, Ottawa, Ontario, Canada
Phone 613/994-9571

Florida Poultry Evaluation Center
R. B. Christmas, Chipley, Fla. 32428
Phone 904/638-0588

New Hampshire Egg Production Test (Cage)
W. C. Skoglund, Department of Poultry Science, University of New Hampshire, Durham, N. H. 03824
Phone 603/862-2130

New Hampshire Egg Production Test (Floor)
W. C. Skoglund, Department of Poultry Science, University of New Hampshire, Durham, N.H. 03824
Phone 603/862-2130

North Carolina Random Sample Egg Laying Test, Salisbury
G. A. Martin, Poultry Extension Department, North Carolina State University, Raleigh, N. C. 27607
Phone 919/755-2621

Pennsylvania Random Sample Laying Test
Mrs. Edgar V. Hammers, Pennsylvania Furnace, Pa. 16865
Phone 814/692-8446

Copies of the final report for any of the Random Sample Egg Production Tests listed above can be obtained by writing to the test supervisor.

Table 1.--Two-year combined summary: Regressed means and 80% confidence limits for traits by stocks entered

STOCK CODE	BREEDER'S NAME AND ADDRESS	STOCK			MORTALITY				AGE AT 50% PRODUCTION (days)		EGG PRODUCTION						FEED PER DAY PER 100 LAYING HENS (pounds)	
		BREEDING		STRAIN OR TRADENAME	GROWING (percent)		LAYING (percent)				HEN HOUSED (number)		HEN-DAY (TO END OF TEST) (percent)		HEN-DAY (LAST 30-60 DAYS) (percent)			
					REGRESSED MEAN	80% CONF. LIMITS	REGRESSED MEAN	80% CONF. LIMITS	REGRESSED MEAN	80% CONF. LIMITS	REGRESSED MEAN	80% CONF. LIMITS	REGRESSED MEAN	80% CONF. LIMITS	REGRESSED MEAN	80% CONF. LIMITS	REGRESSED MEAN	80% CONF. LIMITS
570	Animal Research Institute, Ottawa, Ontario, Canada	WL	PS	Kentville, R.B.C.	1.9	1.6 2.2	5.3	3.9 6.8	169	165 173	217	208 226	65.2	63.4 67.0	52.1	49.7 54.5	****	**** ****
457	Anthony, George M. & Sons, Strausstown, PA 19559	WL	SX	Anthony-76	2.2	1.9 2.5	8.7	7.1 10.6	162	159 165	244	237 251	74.9	73.4 76.4	63.7	61.6 65.8	24.7	23.9 25.5
307	Babcock Poultry Farm, Inc., Ithaca, NY 14850	WL	IN	Babcock B-300 F	1.6	1.3 1.9	7.6	6.3 9.0	163	160 166	240	234 246	73.7	72.5 74.9	63.7	62.2 65.2	24.7	24.1 25.3
463	Babcock Poultry Farm, Inc., Ithaca, NY 14850	WL	IN	Babcock B-300 V	1.3	1.1 1.6	5.2	4.0 6.7	164	161 167	252	245 259	76.4	74.8 78.0	67.8	65.8 69.8	24.1	23.4 24.8
442	Babcock Poultry Farm, Inc., Ithaca, NY 14850	RIRxSYN	BX	Babcock B-380	1.2	1.0 1.4	3.1	2.2 4.1	171	167 175	245	238 252	74.5	73.2 75.8	62.5	60.8 64.2	26.3	25.7 26.9
982	Canada Dept. of Agriculture, Ottawa, Ontario, Canada	WL	SYN	P.D. 58	1.8	1.5 2.1	4.9	3.6 6.4	165	162 168	250	241 259	75.6	73.7 77.5	65.2	62.8 67.6	****	**** ****
437	Carey Farms, Marion, OH 43302	WL	IN	Carey Nick 310	1.5	1.2 1.8	5.3	4.1 6.6	172	169 175	248	242 254	76.7	75.4 78.0	69.3	67.6 71.0	24.7	24.1 25.3
462	Colonial Poultry Farm, Inc., Pleasant Hill, MO 64080	RIRxWPR	BX	True-Line SL 250	1.5	1.4 1.7	5.2	3.9 6.6	177	173 181	213	203 223	66.7	64.6 68.8	53.6	50.7 56.5	25.7	24.9 26.5
432	Colonial Poultry Farm, Inc., Pleasant Hill, MO 64080	WL	IN	True-Line 365 S	1.5	1.2 1.8	5.7	4.5 7.0	163	160 166	232	226 238	70.5	69.3 71.7	58.5	56.9 60.1	21.7	21.1 22.3
456	DeKalb-Warren, Inc., North Brookfield, MA 15350	SYNxRIR	BX	DeKalb Amber Link	1.4	1.1 1.6	3.7	2.7 4.9	172	168 176	249	242 256	76.9	75.4 78.4	66.8	64.8 68.8	26.0	25.3 26.7
305	DeKalb-Warren, Inc., North Brookfield, MA 15350	RIRxRIW	BX	Sex Sal Link-F	1.6	1.3 1.8	3.6	2.5 4.9	173	170 176	239	230 248	73.6	71.9 75.3	60.5	58.2 62.8	24.8	24.1 25.5
458	DeKalb AgResearch, Inc., DeKalb, IL 60115	--	INX	DeKalb X-L Link	1.6	1.3 1.9	6.9	5.6 8.2	165	162 168	251	245 257	77.5	76.3 78.7	64.7	63.2 66.2	25.1	24.5 25.7
447	Euribrid, B. V., Boxmeer, Holland	WL	SX	Hisex White	1.0	0.8 1.3	4.8	3.8 5.9	161	158 164	259	253 265	77.9	76.7 79.1	66.8	65.4 68.2	24.7	24.1 25.3
607	Fisher Poultry Farm, Ltd., Ayton, Ontario, Canada	WL	SX	Fisher 107	1.1	0.9 1.4	5.6	4.3 7.1	168	165 171	241	233 249	73.4	71.9 74.9	64.5	62.4 66.6	25.2	24.4 26.0
464	Hardy, C. Nelson & Son, Essex, MA 01929	--	BX	Hardy Concord	1.4	1.3 1.6	5.6	4.3 7.0	169	165 173	241	230 252	73.5	71.3 75.7	62.0	59.1 64.9	25.0	24.1 25.9

STOCK CODE	FEED PER POUND OF EGGS PRODUCED (pounds)		EGG WEIGHT (oz./doz.)		LARGE AND EXTRA LARGE EGGS (percent)		ALBUMEN QUALITY (Haugh units)		BLOOD SPOTS				MEAT SPOTS				SPECIFIC GRAVITY SCORE		BODY WEIGHT (pounds)		INCOME OVER FEED & CHICK COST (dollars)	
									1/8 INCH OR MORE (percent)		LESS THAN 1/8 INCH (percent)		1/8 INCH OR MORE (percent)		LESS THAN 1/8 INCH (percent)							
	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS
		2.79		24.3		58.6		75.5		1.0		1.8		0.1		0.3		3.78		4.13		3.01
570	2.87	2.95	24.7	25.1	61.9	65.2	76.7	77.9	1.3	1.6	2.2	2.6	0.1	.4	0.7	1.3	3.93	4.08	4.23	4.33	3.42	3.83
		2.36		24.7		68.2		74.0		1.1		1.3		.1		.3		3.46		3.74		4.70
457	2.43	2.50	25.1	25.5	71.0	73.8	75.0	76.0	1.4	1.8	1.7	2.0	.1	.2	.5	.9	3.60	3.74	3.84	3.94	5.05	5.40
		2.44		25.1		71.7		75.1		.5		.9		.1		.4		4.00		3.92		4.52
307	2.50	2.56	25.4	25.7	74.1	76.5	75.9	76.7	.7	.9	1.1	1.4	.1	.3	.6	.9	4.10	4.20	3.99	4.06	4.82	5.12
		2.28		25.2		74.2		76.5		.5		1.0		.1		.7		4.28		3.78		5.25
463	2.35	2.42	25.6	26.0	77.2	80.2	77.5	78.5	.8	1.0	1.3	1.6	.2	.4	1.1	1.5	4.41	4.54	3.88	3.98	5.63	6.01
		2.59		26.2		81.6		77.7		.4		1.6		2.9		10.6		3.31		4.65		4.32
442	2.65	2.71	26.6	27.0	84.1	86.6	78.6	79.5	.6	.8	2.0	2.3	3.7	4.6	11.8	12.9	3.42	3.53	4.73	4.81	4.64	4.96
		2.34		24.4		60.0		80.4		.3		1.0		.1		.5		4.15		3.74		4.81
982	2.42	2.50	24.8	25.2	63.2	66.4	81.6	82.8	.4	.6	1.3	1.6	.2	.5	1.0	1.7	4.30	4.45	3.84	3.94	5.22	5.63
		2.43		24.7		67.0		76.6		.4		.8		.1		.5		3.88		4.02		4.70
437	2.49	2.55	25.1	25.5	69.5	72.0	77.5	78.4	.6	.9	1.1	1.3	.1	.3	.8	1.1	3.99	4.10	4.10	4.18	5.03	5.36
		2.96		25.4		77.3		77.6		.8		1.9		1.4		7.8		3.56		5.24		2.70
462	3.05	3.14	25.8	26.2	81.0	84.7	78.9	80.2	1.1	1.3	2.3	2.6	2.4	3.7	10.0	12.4	3.74	3.92	5.40	5.56	3.14	3.58
		2.33		24.6		65.5		75.9		.4		.9		.1		.3		4.00		3.19		4.61
432	2.38	2.43	24.9	25.2	67.9	70.3	76.8	77.7	.6	.9	1.2	1.5	.1	.3	.5	.8	4.10	4.20	3.27	3.35	4.94	5.27
		2.52		25.9		80.7		80.9		.5		1.6		2.4		11.4		3.33		4.95		4.74
456	2.58	2.64	26.2	26.5	83.5	86.3	81.9	82.9	.7	1.0	2.0	2.4	3.2	4.2	12.8	14.3	3.46	3.59	5.04	5.13	5.08	5.42
		2.51		26.7		86.4		78.7		.5		1.2		1.3		10.2		3.49		4.84		4.42
305	2.59	2.67	27.0	27.3	89.5	92.6	79.8	80.9	.7	0.9	1.5	1.8	2.1	3.1	12.0	14.0	3.64	3.79	4.95	5.06	4.82	5.22
		2.41		25.1		71.6		79.6		.4		1.0		.1		.6		3.80		3.97		4.80
458	2.47	2.53	25.4	25.7	74.0	76.4	80.5	81.4	.5	.7	1.3	1.6	.1	.2	.8	1.1	3.90	4.00	4.05	4.13	5.11	5.42
		2.34		25.0		70.7		75.9		.6		1.0		.1		.4		3.78		3.74		5.32
447	2.40	2.46	25.3	25.6	73.0	75.3	76.7	77.5	.9	1.1	1.2	1.5	.1	.2	.6	.9	3.88	3.98	3.81	3.88	5.61	5.90
		2.40		25.5		77.8		78.9		.3		1.2		.1		.6		3.67		3.91		4.57
607	2.47	2.54	25.8	26.1	80.7	83.6	80.0	81.1	.5	.7	1.4	1.8	.3	.6	1.0	1.5	3.80	3.93	4.01	4.11	4.94	5.31
		2.48		25.5		78.4		76.8		.6		1.5		.2		7.3		3.34		4.40		4.48
464	2.58	2.69	25.9	26.3	82.4	86.4	78.3	79.8	.8	.9	1.6	1.8	.6	1.4	10.5	14.2	3.53	3.72	4.64	4.88	4.95	5.42

*If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5% level.

Table 1.- - Two-year combined summary: Regressed means and 80% confidence limits for traits by stocks entered *(Continued)*

STOCK CODE	BREEDER'S NAME AND ADDRESS	STOCK			MORTALITY				AGE AT 50% PRODUCTION (days)		EGG PRODUCTION						FEED PER DAY PER 100 LAYING HENS (pounds)	
		BREEDING		STRAIN OR TRADENAME	GROWING (percent)		LAYING (percent)				HEN HOUSED (number)		HEN - DAY (TO END OF TEST) (percent)		HEN-DAY (LAST 30-60 DAYS) (percent)			
					RE-GRESSED MEAN	80% * CONF. LIMITS	RE-GRESSED MEAN	80% * CONF. LIMITS	RE-GRESSED MEAN	80% * CONF. LIMITS	RE-GRESSED MEAN	80% * CONF. LIMITS	RE-GRESSED MEAN	80% * CONF. LIMITS	RE-GRESSED MEAN	80% * CONF. LIMITS	RE-GRESSED MEAN	80% * CONF. LIMITS
86	Hardy, C. Nelson & Son, Essex, MA 01929	RIRxBPR	BX	Deluxe Sex Link		1.3		4.7		167		218		68.3		56.5		24.9
					1.5	1.7	6.1	7.7	171	175	228	238	70.4	72.5	59.3	62.1	25.8	26.7
467	Harmen Pedigree, P.O. Box 277, West Groton, MA 01472	--	BX	Golden Link		1.4		[illegible]		[illegible]		233		70.7		58.0		24.3
					1.6	1.7	4.9	6.4	167	171	243	253	73.0	75.3	60.9	63.8	25.1	25.9
466	Harmen Pedigree, P.O. Box 277, West Groton, MA 01472	--	BX	Sex Link		1.3		4.4		167		228		71.5		60.4		24.8
					1.4	1.6	5.8	7.4	170	173	238	248	73.7	75.9	63.3	66.2	25.7	26.6
378	Hubbard Farms, Inc., Walpole, NH 03608	SYNxNH	BX	Golden Comet		1.2		5.3		163		230		71.7		57.8		24.8
					1.4	1.7	6.6	8.2	166	169	237	244	73.2	74.7	59.8	61.8	25.4	26.0
461	Hubbard Farms, Inc., Walpole, NH 03608	WL	SX	Hubbard Leghorn		1.4		5.1		161		243		75.1		64.6		24.2
					1.7	2.0	6.4	7.8	164	167	250	257	76.4	77.7	66.2	67.8	24.8	25.4
356	Ideal Poultry Breeding Farms, Cameron, TX 76520	SYNxWL	BX	Ideal 236		1.5		7.4		168		221		70.5		62.7		23.3
					1.8	2.1	8.9	10.5	171	174	228	235	71.8	73.1	64.4	66.1	23.9	24.5
234	Indiana Farm Bureau Coop., Indianapolis, IN 46241	WL	SX	Duchess 60		1.7		6.0		160		242		77.4		62.4		23.0
					1.9	2.2	7.6	9.3	163	166	252	262	79.3	81.2	65.0	67.6	23.7	24.4
352	Parks Poultry Farm, Altoona, PA 16601	WL	SX	Keystone B-1		1.5		8.6		162		223		71.7		60.4		23.9
					1.8	2.1	10.3	12.1	165	168	230	237	73.1	74.5	62.2	64.0	24.5	25.1
382	Parks Poultry Farm, Altoona, PA 16601	RIRxWPR	BX	Sil-Go-Links		1.4		5.8		169		204		66.0		53.0		23.5
					1.6	1.9	7.4	9.1	172	175	213	222	67.7	69.4	55.3	57.6	24.2	24.9
181	Shaver Poultry Breeding Farm, Cambridge, Ontario, Canada	WL	SX	Starcross 288		1.4		3.2		161		254		77.4		64.2		24.8
					1.7	2.0	4.1	5.1	164	167	260	266	78.5	79.6	65.6	67.0	25.4	26.0
451	Shaver Poultry Breeding Farm, Cambridge, Ontario, Canada	RIR	SX	Starcross 579		1.3		1.9		166		227		69.5		56.4		23.8
					1.6	1.8	2.9	4.0	170	174	235	243	71.1	72.7	58.7	61.0	24.6	25.4
401	Tatum Farms, Dawsonville, GA 30534	WL	SX	Tatum T-100		1.1		8.7		165		220		69.6		60.3		23.8
					1.3	1.6	10.4	12.3	168	171	227	234	70.9	72.2	62.1	63.9	24.5	25.2
449	Tatum Farms, Dawsonville, GA 30534	RIRxSYN	BX	Tatum T-173		1.5		2.4		170		218		67.6		52.1		22.5
					1.7	2.0	3.4	4.6	174	178	225	232	69.1	70.6	54.1	56.1	23.3	24.1
440	Welp's Poultry Breeding Farm, Bancroft, IA 50517	RIR	SX	Welp Line 650 N		1.4		3.8		164		221		68.4		53.8		25.3
					1.6	1.7	5.1	6.6	168	172	231	241	70.5	72.6	56.5	59.2	26.2	27.1
460	Welp's Poultry Breeding Farm, Bancroft, IA 50517	WL	SX	Welp Line 975		1.4		8.2		162		209		65.9		52.7		22.1
					1.7	2.0	9.8	11.6	166	170	216	223	67.2	68.5	54.5	56.3	22.8	23.5

STOCK CODE	FEED PER POUND OF EGGS PRODUCED (pounds)		EGG WEIGHT (oz./doz.)		LARGE AND EXTRA LARGE EGGS (percent)		ALBUMEN QUALITY (Haugh units)		BLOOD SPOTS 1/8 INCH OR MORE (percent)		BLOOD SPOTS LESS THAN 1/8 INCH (percent)		MEAT SPOTS 1/8 INCH OR MORE (percent)		MEAT SPOTS LESS THAN 1/8 INCH (percent)		SPECIFIC GRAVITY SCORE		BODY WEIGHT (pounds)		INCOME OVER FEED & CHICK COST (dollars)	
	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS	RE-GRESSED MEAN	80%* CONF. LIMITS
		2.71		26.3		84.7		75.4		0.6		1.6		1.4		4.1		3.37		5.01		3.79
86	2.80	2.89	26.7	27.1	88.4	92.1	76.8	78.2	0.8	.9	1.8	2.1	2.5	3.9	6.2	8.8	3.56	3.75	5.21	5.41	4.25	4.71
		2.49		25.5		75.5		75.2		.6		1.5		1.3		8.1		3.39		4.15		4.50
467	2.59	2.69	25.9	26.3	79.5	83.5	76.7	78.2	.8	.9	1.6	1.8	2.4	3.9	11.4	15.2	3.58	3.77	4.40	4.65	4.96	5.42
		2.50		26.2		87.1		77.8		.9		1.8		1.3		2.4		3.36		4.80		4.39
466	2.59	2.68	26.7	27.2	91.1	95.1	79.2	80.6	1.1	1.2	2.0	2.2	2.4	3.9	4.3	6.9	3.54	3.72	5.04	5.28	4.86	5.33
		2.51		26.0		78.9		77.3		.8		1.7		4.9		12.5		3.50		4.46		4.46
378	2.58	2.65	26.4	26.8	81.7	84.5	78.2	79.1	1.0	1.3	2.0	2.4	6.1	7.4	13.9	15.4	3.62	3.74	4.55	4.64	4.81	5.16
		2.39		25.1		70.1		77.2		1.0		1.4		.1		.4		3.66		4.06		4.69
461	2.45	2.51	25.4	25.7	72.6	75.1	78.1	79.0	1.3	1.6	1.7	2.1	.1	.3	.6	.9	3.77	3.88	4.14	4.22	5.05	5.41
		2.46		25.4		74.2		74.3		.6		1.0		.1		.4		3.67		4.19		3.80
356	2.52	2.58	25.7	26.0	76.7	79.2	75.2	76.1	.8	1.1	1.3	1.6	.1	.3	.7	1.0	3.78	3.89	4.28	4.37	4.15	4.50
		2.34		23.8		52.6		79.9		.6		1.1		.1		.6		3.64		3.86		4.90
234	2.43	2.52	24.2	24.6	55.9	59.2	81.1	82.3	.8	1.0	1.4	1.7	.3	.8	1.2	2.0	3.80	3.96	3.98	4.10	5.31	5.72
		2.47		25.0		68.6		74.9		.7		1.1		.1		.4		3.87		3.93		3.86
352	2.53	2.59	25.3	25.6	71.2	73.8	75.9	76.9	.9	1.2	1.3	1.6	.2	.5	.6	1.0	3.99	4.11	4.02	4.11	4.27	4.68
		2.72		25.8		75.8		78.4		.8		1.2		1.7		9.8		3.33		4.78		3.22
382	2.79	2.86	26.1	26.4	78.9	82.0	79.5	80.6	1.1	1.4	1.5	1.8	2.6	3.7	11.5	13.4	3.48	3.63	4.89	5.00	3.61	4.00
		2.31		25.9		79.4		79.4		.3		1.2		.1		.6		3.73		4.06		5.42
181	2.37	2.43	26.2	26.5	81.8	84.2	80.2	81.0	.5	.6	1.5	1.8	.1	.2	.8	1.1	3.83	3.93	4.13	4.20	5.71	6.00
		2.55		26.6		88.4		77.9		.7		1.4		.8		6.1		3.38		4.69		4.35
451	2.62	2.69	27.0	27.4	91.4	94.4	79.1	80.3	.9	1.2	1.7	2.1	1.4	2.3	7.7	9.5	3.54	3.70	4.82	4.95	4.73	5.11
		2.52		25.3		72.2		79.6		.8		1.4		.1		.4		3.43		3.96		3.84
401	2.58	2.64	25.6	25.9	74.8	77.4	80.6	81.6	1.1	1.4	1.7	2.1	.2	.4	.7	1.0	3.54	3.65	4.05	4.14	4.19	4.54
		2.65		25.2		71.1		78.5		.9		1.8		2.0		6.7		3.34		4.66		3.78
449	2.72	2.79	25.5	25.8	73.9	76.7	79.5	80.5	1.2	1.5	2.2	2.6	2.8	3.7	7.9	9.2	3.48	3.62	4.77	4.88	4.12	4.46
		2.77		25.3		72.1		75.5		.8		1.3		1.4		5.9		3.20		4.66		3.62
440	2.86	2.95	25.7	26.1	75.8	79.5	76.9	78.3	1.0	1.2	1.6	1.8	2.5	3.9	8.3	11.2	3.38	3.56	4.85	5.04	4.07	4.52
		2.57		24.3		60.5		75.6		.8		1.3		.1		.4		3.46		3.77		3.35
460	2.63	2.69	24.6	24.9	63.1	65.7	76.5	77.4	1.0	1.3	1.6	2.0	.1	.2	.7	1.0	3.57	3.68	3.85	3.93	3.75	4.15

*If the confidence limits for two regressed means overlap, the two means are not significantly different at the 5% level.

PROCEDURES USED FOR COMPUTING COMBINED SUMMARY VALUES

Statistical Methods

The two-year combined summary includes performance data on 25 stocks that were entered in both the 1975-76 and 1976-77 tests and on 5 stocks that were entered only in the 1976-77 tests. Birds were tested at 17 locations in 1975-76 and at 13 locations in 1976-77. Table 3 lists the locations. Certain traits were not measured at some of the locations. These are identified with an NR (not reported) in the appropriate columns in table 3.

Replicate data were reported by 17 locations in 1975-76 and by 13 locations in 1976-77. The number of pens and the number of stocks tested at each location for the two years are given in table 3.

The percentage data for both years for the six traits--growing mortality, laying mortality, large blood spots, small blood spots, large meat spots, and small meat spots--were converted to angles with the arcsin transformation prior to analysis. However, the test-year adjustment factors shown in table 3 and the regressed means and confidence limits shown for these traits in table 1 are given in percent.

The replicate data were analyzed by least-squares procedures to obtain the test-year adjustment factors shown in table 3 and the repeatability estimates and the correlations among pens within tests shown in table 2. The test-year adjustment factors were then used to adjust the simple stock average for test and year effects. The adjusted stock averages (the least-squares stock means) were then regressed toward the overall mean ($\hat{\mu}$) to account for variations in number of tests entered, number of years entered, and number of replicates per test. The formula used to compute the regressed mean is:

$$\text{Regressed Mean} = \hat{\mu} + \frac{r_{2/C}}{1+(k_3-1)x_1+(k_1-k_3)x_2+(k_2-k_3)r_1+ (1/C)-k_1-k_2+k_3\ r_2}(s)$$

where:

$\hat{\mu}$ = the average of the test and year adjusted stock means.

r_1 = repeatability within year.

r_2 = repeatability from year-to-year.

x_1 = the correlation among replicates within year and test.

x_2 = the correlation among pens of the same stock from year-to-year for the same test.

k_1 = an average of the number of pens per test (averaged over years).

k_2 = an average of the number of pens per year (averaged over tests).

k_3 = an average of the number of replicates per test-year subclass.

C = the diagonal inverse element for that stock. The reciprocal of C, i.e., $\frac{1}{C}$, is equal to nk_3 if the assumption is made that the adjustments for test-year effects are made without error; where n is the number of test-year subclasses in which that stock is entered.

s = the test-year adjusted stock average minus the overall mean $\hat{\mu}$.

The correlations used in computing the regression coefficient were obtained from estimates of the variance components for stocks ($\hat{\sigma}^2_s$), the stock-X-test interaction ($\hat{\sigma}^2_{st}$), the stock-X-year interaction ($\hat{\sigma}^2_{sy}$), and the random error ($\hat{\sigma}^2_e$). The variance component estimates were obtained by equating the computed mean squares for these effects to their expectations. The mean squares for stocks were adjusted for the test-year subclass effects and the mean squares for the stock-X-test interaction and the stock-X-year interaction were adjusted by least-squares procedures for the effects of stocks and the test-year subclasses. The three-factor interaction was assumed to be non-existent. Ratios of the variance component estimates that were used to compute the correlations follow:

$$\text{Correlation Among Replicates} = x_1 = \frac{\hat{\sigma}_s^2 + \hat{\sigma}_{st}^2 + \hat{\sigma}_{sy}^2}{\hat{\sigma}_s^2 + \hat{\sigma}_{st}^2 + \hat{\sigma}_{sy}^2 + \hat{\sigma}_e^2}$$

$$\text{Correlations from Year-to-Year (same test)} = x_2 = \frac{\hat{\sigma}_s^2 + \hat{\sigma}_{st}^2}{\hat{\sigma}_s^2 + \hat{\sigma}_{st}^2 + \hat{\sigma}_{sy}^2 + \hat{\sigma}_e^2}$$

$$\text{Repeatability from Test-to-Test (within year)} = r_1 = \frac{\hat{\sigma}_s^2 + \hat{\sigma}_{sy}^2}{\hat{\sigma}_s^2 + \hat{\sigma}_{st}^2 + \hat{\sigma}_{sy}^2 + \hat{\sigma}_e^2}$$

$$\text{Repeatability from Test-to-Test (between years)} = r_2 = \frac{\hat{\sigma}_s^2}{\hat{\sigma}_s^2 + \hat{\sigma}_{st}^2 + \hat{\sigma}_{sy}^2 + \hat{\sigma}_e^2}$$

An approximate standard error (SE) was computed for each regressed mean as follows:

$$SE = b \sqrt{C(\hat{\sigma}_e^2 + k_1 \hat{\sigma}_{st}^2 + k_2 \hat{\sigma}_{sy}^2)}$$

where b is the regression coefficient given above in the formula for the regressed mean. Confidence limits were then computed for each regressed mean as follows:

$$\text{Regressed Mean} \pm 1.3 \text{ SE}$$

The constant 1.3 was selected in order that the probability of the confidence limits overlapping by chance alone between any two means would be about 0.03. This makes the test of significance among regressed means almost comparable to using Duncan's range test at the 0.05 level of probability.

Definition of Statistical Terms

The following definitions will help the reader interpret the analytical procedures:

Overall mean	The average of the test-year adjusted means for all stocks. This is an estimate of what the overall average would have been had all stocks been entered in all tests in both years.
Range	The range represents the difference between the expected maximum and minimum performance among the 43* stocks, based on the regressed means.
Common stocks	Stocks that are being tested at more than one location.
Test-year adjustment factor	The amount added to or subtracted from the actual performance of the stocks at a given location in a given year to bring them to the average of all the location-year subclasses that had complete data. These factors were determined on an intrastock basis with a least-squares analysis, and they are given in table 3.
Repeatability within year	An intraclass correlation that measures the tendency for common stocks to rank the same from test-to-test within year. Theoretically, it can vary from 0.00 to 1.00.
Repeatability between years	A correlation which measures the tendency for common stocks to rank the same from test-to-test from one year to another. The difference between the repeatability within year and repeatability between years indicates the relative importance of the stock-by-year interaction.
Correlation among replicates	This correlation measures the repeatability among replicates of the same stock in the same test and year. The higher the correlation among replicates the less need there is for replication of stocks within test and year.
Correlation from year-to-year within tests	A correlation which measures the tendency for common stock to rank the same from year-to-year when tested at the same location. The difference in the repeatability between years and in the correlation from year-to-year within tests indicates the relative importance of the stock-by-test interaction.
Confidence limits	The confidence limits for each regressed mean are computed so that the probability is about 0.80 that the "true" stock mean lies within the interval. They are presented in this report, however, for the purpose of providing approximate tests of significance for differences among stocks.

*Includes 13 experimental stocks.

TABLE 2.--Analytical data for the traits measured
1975-76 and 1976-77

Traits	Overall means	Regressed means		Repeatability		Correlations within test	
		Min.	Max.	Within year (r_1)	Year-to-year (r_2)	Among replicates (x_1)	Year-to-year (x_2)
Growing mortality----------percent-	1.64	1.04	2.16	0.1506	0.0654	0.1854	0.1001
Laying mortality----------percent-	6.01	2.88	10.43	.1575	.1292	.2228	.1944
Age at 50% production---------days-	164.3	161	177	.5068	.4267	.7820	.7019
Hen-housed egg production---number-	240.2	207	260	.5553	.5166	.7086	.6699
Hen-day egg production to end of test----------percent-	73.3	65.2	79.3	.6219	.5924	.7133	.6839
Hen-day egg production last 30 to 60 days----------percent-	62.4	50.6	69.3	.4505	.4286	.5502	.5283
Feed per 100 birds per day--pounds-	24.76	21.70	26.40	.5952	.5078	.7097	.6223
Feed per pound of eggs------pounds-	2.62	2.29	3.05	.6681	.6357	.7405	.7082
Egg weight----------ounces/dozen-	25.5	24.2	27.0	.7511	.6568	.8211	.7267
Large and extra large eggs-percent-	70.5	55.9	91.4	.7684	.7019	.8727	.8062
Albumen quality--------Haugh units-	77.23	75.0	81.9	.5730	.5190	.7111	.6570
Large blood spots----------percent-	.86	.41	1.43	.1619	.1097	.2108	.1586
Small blood spots----------percent-	1.50	1.05	2.25	.1351	.0872	.2458	.1979
Large meat spots----------percent-	.30	.00	6.08	.5906	.5530	.7499	.7123
Small meat spots----------percent-	1.10	.52	14.03	.7352	.7309	.7844	.7801
Specific gravity----------score-	4.11	3.99	4.08	.4605	.4324	.5478	.5197
Body weight----------pounds-	4.16	3.27	5.40	.8290	.8160	.8333	.8204
Income over feed and chick cost----------dollars-	5.50	3.14	5.71	.5398	.4863	.7226	.6691

NOTE: The values for these factors are based on the 30 commercially available stocks as well as the 13 experimental stocks that were tested. The individual performance data for the experimental entries were analyzed but not published in this report.

TABLE 3.--Factors used to adjust for test differences

Test	Pens (number)		Stocks tested (number)		Mortality (percent)			
					Growing period		Laying period	
	1976	1977	1976	1977	1976	1977	1976	1977
Central Canada No. 6 - (2/cage)---	48	48	12	12	+.01	-.36	-1.27	-2.39
Central Canada No. 7 - (2/cage)---	48	48	12	12	-.08	-.30	-1.55	-1.94
Florida No. 7 - Floor----------	24	24	12	12	-.01	+.02	+.48	+.64
Florida No. 8 - (2/cage)----------	48	48	12	12	-.01	+.02	+.33	+.33
Florida No. 9 - Floor----------	24	24	12	12	-.01	+.02	+.47	+1.46
Florida No. 10 - (2/cage)---------	48	48	12	12	-.01	+.02	+.33	+.44
New Hampshire No. 7 - (3/cage)----	184	192	23	25	-.01	+.04	-.03	-.05
New Hampshire No. 4 - Floor-------	24	24	8	6	-.03	-.02	+1.39	-.24
North Carolina No. 3 - Floor------	20	18	10	9	+.01	+.29	+.01	+.45
North Carolina No. 4-(2/cage)-----	40	36	10	9	-.16	-.34	-.05	-.01
North Carolina No. 5 - (7/cage)---	20	18	10	9	-.01	-.08	-4.13	-.28
Pennsylvania No. 1 - Floor--------	48	48	24	24	+.40	+.13	+.19	+.20
Pennsylvania No. 2 - (3/cage)-----	48	48	24	24	+.40	+.13	+.01	+.18
Tennessee No. 5 - (2/cage)--------	28	--	14	--	-.46	--	+.14	--
Tennessee No. 6 - (2/cage)--------	28	--	14	--	-.46	--	+.01	--
Tennessee No. 7 - (2/cage)--------	28	--	14	--	-.46	--	-.01	--
Tennessee No. 8 - (2/cage)--------	28	--	14	--	-.46	--	+.01	--

TABLE 3.--Factors used to adjust for test differences--Continued

Test	Age at 50 percent production (days)		Egg production					
			Hen-housed (number)		Hen-day (to end of test) (percent)		Hen-day (last 30-60 days) (percent)	
	1976	1977	1976	1977	1976	1977	1976	1977
Central Canada No. 6 - (2/cage)---	+4.57	+8.09	+6.38	+11.29	+1.89	+1.30	-2.56	+.72
Central Canada No. 7 - (2/cage)---	+9.86	+8.46	+8.78	+7.42	+2.21	+.45	-.67	+1.65
Florida No. 7 - Floor----------	+.85	+.64	-.63	-4.22	+.87	-.71	+2.17	+1.31
Florida No. 8 - (2/cage)----------	+1.23	+1.27	-.39	+.04	+.65	+.46	+1.00	-.77
Florida No. 9 - Floor----------	+.77	+1.39	-1.34	-7.65	+.62	-.75	+1.86	+2.35
Florida No. 10 - (2/cage)---------	+1.44	+.23	+2.45	+1.66	+1.22	+.90	+1.08	-1.32
New Hampshire No. 7 - (3/cage)----	+11.19	+3.85	-4.74	-4.26	+1.38	-1.01	+3.64	-2.81
New Hampshire No. 4 - Floor-------	+12.16	+2.15	-16.09	-1.29	-.63	-1.61	+2.03	-.92
North Carolina No. 3 - Floor------	-7.76	-4.54	-12.98	-14.50	-4.40	-3.54	-2.48	+1.64
North Carolina No. 4 - (2/cage)---	-7.91	-11.54	+3.65	-2.43	-.26	-2.46	-.34	-3.17
North Carolina No. 5 - (7/cage)---	-9.41	-13.32	+25.43	+5.28	+1.47	-.54	+5.01	-.28
Pennsylvania No. 1 - Floor--------	+5.92	-12.44	-5.38	-1.96	+.56	-1.67	-2.72	-3.67
Pennsylvania No. 2 - (3/cage)-----	+4.94	-12.03	+3.92	+1.56	+3.42	+.19	-.12	-2.61
Tennessee No. 5 - (2/cage)--------	-.62	--	+4.80	--	+3.48	--	+3.83	--
Tennessee No. 6 - (2/cage)--------	-.62	--	+6.94	--	+3.46	--	+.99	--
Tennessee No. 7 - (2/cage)--------	-.62	--	+7.35	--	+2.91	--	+3.24	--
Tennessee No. 8 - (2/cage)--------	-.62	--	+7.96	--	+3.27	--	+3.27	--

TABLE 3.--Factors used to adjust for test differences--Continued

Test	Feed per pound of eggs (pounds)		Feed per 100 birds per day (pounds)		Egg weight (oz./dozen)		Large and extra large eggs (percent)	
	1976	1977	1976	1977	1976	1977	1976	1977
Central Canada No. 6 - (2/cage)---	-.03	+.07	NR*	NR*	+.74	+.86	+14.72	+16.72
Central Canada No. 7 - (2/cage)---	-.02	+.12	NR*	NR*	+.95	+.85	+17.82	+16.56
Florida No. 7 - Floor----------	-.04	+.04	-.23	+.15	-.15	-.05	-6.53	-9.93
Florida No. 8 - (2/cage)----------	+.12	+.13	+.47	+.53	-.95	-.87	-13.32	-15.80
Florida No. 9 - Floor----------	-.05	+.04	-.53	+.17	-.30	+.09	-8.26	-8.84
Florida No. 10 - (2/cage)---------	+.11	+.12	+.62	+.48	-.94	-.84	-14.36	-15.82
New Hampshire No. 7 - (3/cage)----	-.21	-.33	--	-2.49	+1.49	+1.05	+23.61	+18.36
New Hampshire No. 4 - Floor-------	+.01	-.06	--	+.05	+2.15	+1.45	+28.77	+20.20
North Carolina No. 3 - Floor------	+.15	+.12	+.57	+.56	-.56	-.37	-7.19	-15.58
North Carolina No. 4 - (2/cage)---	+.06	+.16	+.75	+1.27	-.87	-.93	-8.98	-17.75
North Carolina No. 5 - (7/cage)---	+.01	+.09	+1.26	+1.32	-.56	-.91	-6.95	-17.38
Pennsylvania No. 1 - Floor--------	-.25	-.11	-3.07	-1.92	-.20	-.61	+5.97	+.20
Pennsylvania No. 2 - (3/cage)-----	-.21	-.03	-1.68	-.71	+.13	-.66	+6.79	-3.06
Tennessee No. 5 - (2/cage)--------	-.23	--	--	--	+.12	--	-6.87	--
Tennessee No. 6 - (2/cage)--------	-.25	--	--	--	+.35	--	-2.62	--
Tennessee No. 7 - (2/cage)--------	-.25	--	--	--	+.19	--	-5.54	--
Tennessee No. 8 - (2/cage)--------	-.25	--	--	--	+.24	--	-4.70	--

* Data for this trait not reported.

TABLE 3.--Factors used to adjust for test differences--Continued

Test	Albumen quality (Haugh units)		Blood spots 1/8 inch or more (percent)		Blood spots less than 1/8 inch (percent)		Meat spots 1/8 inch or more (percent)	
	1976	1977	1976	1977	1976	1977	1976	1977
Central Canada No. 6 - (2/cage)---	+1.95	+2.36	-.36	-.23	-.33	-.20	-.01	+.01
Central Canada No. 7 - (2/cage)---	+1.94	+2.20	-.26	-.10	-.35	-.22	-.01	-.01
Florida No. 7 - Floor----------	+3.11	-3.90	+.01	-.12	-.10	-.40	+.04	-.01
Florida No. 8 - (2/cage)----------	+2.47	-1.82	+.06	+.04	-.01	+.03	+.03	+.01
Florida No. 9 - Floor----------	+3.77	-4.32	+.01	+.01	-.15	-.30	+.01	+.01
Florida No. 10 - (2/cage)---------	+2.00	-3.71	+.01	+.03	-.02	+.03	+.01	+.02
New Hampshire No. 7 - (3/cage)----	+2.10	-1.07	+.44	+.26	+.46	+.88	+.13	+.48
New Hampshire No. 4 - Floor-------	+1.71	-6.05	+.28	+.34	-.03	+1.41	+.08	+.15
North Carolina No. 3 - Floor------	+1.51	+1.37	-.03	+.01	+.01	+.09	-.32	-.53
North Carolina No. 4 - (2/cage)---	+.53	+1.42	-.10	-.08	+.01	+.02	-.49	-.30
North Carolina No. 5 (7/cage)-----	+1.68	-.19	-.01	-.21	-.01	+.01	-.17	-.35
Pennsylvania No. 1 - Floor--------	-2.91	-2.24	+.01	+.01	+.02	+.04	+.08	+.14
Pennsylvania No. 2 - (3/cage)-----	-2.02	-1.87	+.01	+.32	+.04	+.02	+.12	+1.79
Tennessee No. 5 - (2/cage)--------	+6.76	--	-.03	--	-.18	--	-.12	--
Tennessee No. 6 - (2/cage)--------	+7.91	--	-.19	--	-.27	--	-.83	--
Tennessee No. 7 (2/cage)----------	+8.81	--	+.01	--	-.01	--	-.11	--
Tennessee No. 8 - (2/cage)--------	+7.77	--	-.10	--	+.03	--	-.13	--

TABLE 3.--Factors used to adjust for test differences--Continued

Test	Meat spots less than 1/8 inch (percent)		Specific gravity score		Body weight (pounds)		Income over feed and chick cost (dollars)	
	1976	1977	1976	1977	1976	1977	1976	1977
Central Canada No. 6 - (2/cage)---	+.04	-.01	+.85	+.84	+.33	+.20	+.83	-.12
Central Canada No. 7 - (2/cage)---	+.04	-.10	+.95	+.99	+.30	+.18	+.92	-.43
Florida No. 7 - Floor----------	+.27	+.27	-.96	-1.76	-.05	+.06	NR*	NR*
Florida No. 8 - (2/cage)----------	+.38	+.54	-1.43	-1.82	+.06	-.01	NR*	NR*
Florida No. 9 - Floor----------	+.27	+.65	-1.08	-1.78	-.06	+.15	NR*	NR*
Florida No. 10 - (2/cage)---------	+.53	+.49	-1.44	-1.98	+.05	-.02	NR*	NR*
New Hampshire No. 7 - (3/cage)----	-1.28	-6.24	+1.63	+1.37	+.02	-.30	-1.94	-2.26
New Hampshire No. 4 - Floor-------	-2.94	-9.24	+1.34	+1.00	-.11	-.05	-2.56	-2.81
North Carolina No. 3 - Floor------	+.02	+.02	+1.88	+1.81	-.13	-.09	+1.07	+1.07
North Carolina No. 4 - (2/cage)---	+.05	+.22	+1.94	+1.81	+.15	+.07	+1.80	+1.36
North Carolina No. 5 - (7/cage)---	-.01	+.18	+1.71	+1.62	+.18	+.05	+2.29	+1.65
Pennsylvania No. 1 - Floor--------	+.39	+.30	-1.91	-1.85	-.23	-.20	-.33	-.11
Pennsylvania No. 2 - (3/cage)-----	+.15	+.21	-1.88	-1.83	-.29	-.25	-.22	-.23
Tennessee No. 5 - (2/cage)--------	+.20	--	+.30	--	-.36	--	-.40	--
Tennessee No. 6 - (2/cage)--------	+.04	--	+.29	--	-.11	--	-.31	--
Tennessee No. 7 - (2/cage)--------	+.13	--	+.43	--	-.26	--	-.26	--
Tennessee No. 8 - (2/cage)--------	+.11	--	+.47	--	-.15	--	-.24	--

* Data for this trait not reported.

RANGE GROUP RANKING BASED ON 1976-77 TESTS

How Group Rankings Were Determined for Each Trait

The information in this section deals only with the test data obtained during the 1976-77 test year.

The performance of each entry in the 6 Random Sample Egg Production Tests conducted during 1976-77 is reported as the Range Group Rank of the entry for the trait measured. These rankings were determined in the following manner. For each trait the entries in each test were alined in descending order of performance from the most desirable to the least desirable. The "mean" or average performance for the trait was then determined. All entries above the mean are in range group 1 or 2, and those below the mean are in range group 3 or 4. The dividing point for the entries above or below the mean is the midpoint of the range between the mean and the top or bottom entry. An illustration follows:

> Stocks entered in the New Hampshire Cage test laid a mean, or average, of 245.57 eggs per pullet housed. The largest number of eggs laid by an entry was 268.20 and the lowest number of 195.90 eggs. To arrive at the dividing point between the first and second range groups, the mean (245.57 eggs) was subtracted from the largest number of eggs produced (268.20). The result, 22.63 eggs, was divided by two to get the midpoint of the range (11.32 eggs). This was subtracted from the top entry (268.20 - 11.32) to arrive at the dividing point (256.88 eggs) between the first and second range groups. To determine the dividing point between the third and fourth range groups, the same procedure was used, except that the lowest number of eggs produced (195.90) was subtracted from the mean (245.57 eggs). This difference, or range (49.67 eggs), was then divided by two and the result (24.84 eggs) was subtracted from the mean (245.57 - 24.84) to get the dividing point (220.73 eggs) between the third and fourth range groups. These determinations for ten traits are tabulated in table 4.

The breeders of the stock tested and the Range Group Ranking, by traits, of each entry of the stock are shown in table 5. Each entry is also identified by the abbreviated name of the entrant. If the sample was drawn from a source other than the entrant's hatchery or supply flock, the abbreviated name of the source of the sample is shown in parentheses following the entrant's name.

The listing of the entries in the four range groups, with all entries of each stock in one table, allows the reader to evaluate quickly a stock based on this method of analysis. It should be kept in mind, however, that this method provides just four broad classifications. One-tenth of an egg or one-tenth of a percent difference in mortality could move an entry up or down one Range Group Rank, depending on its place in the range grouping.

TABLE 4.--Upper and lower limits for each range group by traits and tests, 1976-77

Traits measured	Tests	
	Central Canada	Florida
Income over feed and chick cost;		
Average-----dol./hen housed-	5.445	
Range group 1----------	6.320 - 5.882	
Range group 2----------	5.881 - 5.445	Not Reported
Range group 3----------	5.444 - 4.302	
Range group 4----------	4.301 - 3.160	
Egg production;		
Average---number/hen housed-	238.95	242.45
Range group 1----------	256.30 - 247.62	264.90 - 253.67
Range group 2----------	247.61 - 238.95	253.66 - 242.45
Range group 3----------	238.94 - 221.77	242.44 - 230.97
Range group 4----------	221.76 - 204.60	230.96 - 219.50
Age at 50 percent production;		
Average----------days-	155.5	164.3
Range group 1----------	152.0 - 153.7	159.0 - 161.6
Range group 2----------	153.8 - 155.5	161.7 - 164.3
Range group 3----------	155.6 - 158.2	164.4 - 169.1
Range group 4----------	158.3 - 161.0	169.2 - 174.0
Growing mortality;		
Average----------percent-	3.82	1.22
Range group 1----------	2.30 - 3.06	.40 - 0.81
Range group 2----------	3.07 - 3.82	.82 - 1.22
Range group 3----------	3.83 - 4.61	1.23 - 2.26
Range group 4----------	4.62 - 5.40	2.27 - 3.30
Laying mortality;		
Average----------percent-	14.19	5.64
Range group 1----------	10.50 - 12.34	2.60 - 4.12
Range group 2----------	12.35 - 14.19	4.13 - 5.64
Range group 3----------	14.20 - 18.79	5.65 - 7.57
Range group 4----------	18.80 - 23.40	7.58 - 9.50
Egg weight;		
Average--------ounces/dozen-	24.53	25.93
Range group 1----------	25.50 - 25.01	27.10 - 26.51
Range group 2----------	25.00 - 24.53	26.50 - 25.93
Range group 3----------	24.52 - 24.11	25.92 - 25.56
Range group 4----------	24.10 - 23.70	25.55 - 25.20
Large and extra large eggs;		
Average----------percent-	56.79	86.48
Range group 1----------	70.30 - 63.54	92.70 - 89.59
Range group 2----------	63.53 - 56.79	89.58 - 86.48
Range group 3----------	56.78 - 50.09	86.47 - 82.89
Range group 4----------	50.08 - 43.40	82.88 - 79.30
Feed per pound of eggs;		
Average----------pounds-	2.369	2.389
Range group 1----------	2.230 - 2.299	2.240 - 2.314
Range group 2----------	2.300 - 2.369	2.315 - 2.389
Range group 3----------	2.370 - 2.599	2.390 - 2.479
Range group 4----------	2.600 - 2.830	2.480 - 2.570
Albumen quality;		
Average---------Haugh units-	76.33	81.14
Range group 1----------	79.80 - 78.06	85.10 - 83.12
Range group 2----------	78.05 - 76.33	83.11 - 81.14
Range group 3----------	76.32 - 74.71	81.13 - 79.52
Range group 4----------	74.70 - 73.10	79.51 - 77.90
Blood spots, all sizes;		
Average----------percent-	4.25	3.22
Range group 1----------	2.70 - 3.45	2.00 - 2.61
Range group 2----------	3.46 - 4.25	2.62 - 3.22
Range group 3----------	4.26 - 5.97	3.23 - 3.96
Range group 4----------	5.98 - 7.70	3.97 - 4.70

TABLE 4.--Upper and lower limits for each range group by traits and tests, 1976-77--(Continued)

Traits measured	Tests	
	New Hampshire Cage	New Hampshire Floor
Income over feed and chick cost;		
Average-----dol./hen housed-	7.067	7.545
Range group 1----------	8.340 - 7.703	8.370 - 7.957
Range group 2----------	7.702 - 7.067	7.956 - 7.545
Range group 3----------	7.066 - 6.168	7.544 - 6.537
Range group 4----------	6.167 - 5.270	6.536 - 5.530
Egg production;		
Average---number/hen housed-	245.57	240.53
Range group 1----------	268.20 - 256.88	259.70 - 250.11
Range group 2----------	256.87 - 245.57	250.10 - 240.53
Range group 3----------	245.56 - 220.73	240.52 - 217.96
Range group 4----------	220.72 - 195.90	217.95 - 195.40
Age at 50 percent production;		
Average----------days-	164.3	166.8
Range group 1----------	157.0 - 160.6	161.0 - 163.9
Range group 2----------	160.7 - 164.3	164.0 - 166.8
Range group 3----------	164.4 - 168.6	166.9 - 168.9
Range group 4----------	168.7 - 173.0	169.0 - 171.0
Growing mortality;		
Average----------percent--	1.07	1.60
Range group 1----------	.00 - 0.53	.80 - 1.20
Range group 2----------	.54 - 1.07	1.21 - 1.60
Range group 3----------	1.08 - 2.08	1.61 - 2.00
Range group 4----------	2.09 - 3.10	2.01 - 2.40
Laying mortality;		
Average----------percent--	8.48	8.85
Range group 1----------	2.60 - 5.54	1.70 - 5.27
Range group 2----------	5.55 - 8.48	5.28 - 8.85
Range group 3----------	8.49 - 18.40	8.86 - 16.97
Range group 4----------	18.41 - 28.40	16.98 - 25.10
Egg weight;		
Average--------ounces/dozen-	25.04	24.76
Range group 1----------	26.20 - 25.62	25.80 - 25.28
Range group 2----------	25.61 - 25.04	25.27 - 24.76
Range group 3----------	25.03 - 24.17	24.75 - 24.33
Range group 4----------	24.16 - 23.30	24.32 - 23.90
Large and extra large eggs;		
Average----------percent--	60.35	62.20
Range group 1----------	77.20 - 68.77	72.10 - 67.15
Range group 2----------	68.76 - 60.35	67.14 - 62.20
Range group 3----------	60.34 - 49.92	62.19 - 56.20
Range group 4----------	49.91 - 39.50	56.19 - 50.20
Feed per pound of eggs;		
Average----------pounds--	2.896	2.675
Range group 1----------	2.570 - 2.733	2.510 - 2.592
Range group 2----------	2.734 - 2.896	2.593 - 2.675
Range group 3----------	2.897 - 3.153	2.676 - 2.772
Range group 4----------	3.154 - 3.410	2.773 - 2.870
Albumen quality;		
Average--------Haugh units--	79.59	85.71
Range group 1----------	83.90 - 81.74	87.70 - 86.70
Range group 2----------	81.73 - 79.59	86.69 - 85.71
Range group 3----------	79.58 - 77.19	85.70 - 84.85
Range group 4----------	77.18 - 74.80	84.84 - 84.00
Blood spots, all sizes;		
Average----------percent-	1.17	0.35
Range group 1----------	.00 - 0.58	.00 - 0.17
Range group 2----------	.59 - 1.17	.18 - .35
Range group 3----------	1.18 - 3.68	.36 - 1.22
Range group 4----------	3.69 - 6.20	1.23 - 2.10

TABLE 4.--Upper and lower limits for each range group by traits and tests, 1976-77--(Continued)

Traits measured	Tests	
	North Carolina	Pennsylvania
Income over feed and chick cost;		
Average-----dol./hen housed-	3.865	4.900
Range group 1----------	4.510 - 4.187	6.410 - 5.655
Range group 2----------	4.186 - 3.865	5.654 - 4.900
Range group 3----------	3.864 - 3.627	4.899 - 3.765
Range group 4----------	3.626 - 3.390	3.764 - 2.630
Egg production;		
Average---number/hen housed-	251.28	238.62
Range group 1----------	263.20 - 257.24	265.90 - 252.26
Range group 2----------	257.23 - 251.28	252.25 - 238.62
Range group 3----------	251.27 - 242.89	238.61 - 217.06
Range group 4----------	242.88 - 234.50	217.05 - 195.50
Age at 50 percent production;		
Average----------days-	175.5	180.6
Range group 1----------	168.0 - 171.7	162.0 - 171.3
Range group 2----------	171.8 - 175.5	171.4 - 180.6
Range group 3----------	175.6 - 180.7	180.7 - 188.8
Range group 4----------	180.8 - 186.0	188.9 - 197.0
Growing mortality;		
Average----------percent-	2.43	1.03
Range group 1----------	1.10 - 1.76	.00 - 0.51
Range group 2----------	1.77 - 2.43	.52 - 1.03
Range group 3----------	2.44 - 3.26	1.04 - 2.51
Range group 4----------	3.27 - 4.10	2.52 - 4.00
Laying mortality;		
Average----------percent-	6.42	5.40
Range group 1----------	2.90 - 4.66	1.60 - 3.50
Range group 2----------	4.67 - 6.42	3.51 - 5.40
Range group 3----------	6.43 - 8.76	5.41 - 8.80
Range group 4----------	8.77 - 11.10	8.81 - 12.20
Egg weight;		
Average--------ounces/dozen-	26.57	26.36
Range group 1----------	28.00 - 27.28	28.10 - 27.23
Range group 2----------	27.27 - 26.57	27.22 - 26.36
Range group 3----------	26.56 - 26.08	26.35 - 25.38
Range group 4----------	26.07 - 25.60	25.37 - 24.40
Large and extra large eggs;		
Average----------percent-	95.83	77.70
Range group 1----------	98.90 - 97.36	91.60 - 84.62
Range group 2----------	97.35 - 95.83	84.61 - 77.70
Range group 3----------	95.82 - 94.06	77.69 - 66.55
Range group 4----------	94.05 - 92.30	66.54 - 55.40
Feed per pound of eggs;		
Average----------pounds-	2.364	2.622
Range group 1----------	2.210 - 2.287	2.280 - 2.451
Range group 2----------	2.288 - 2.364	2.452 - 2.622
Range group 3----------	2.365 - 2.407	2.623 - 2.921
Range group 4----------	2.408 - 2.450	2.922 - 3.220
Albumen quality;		
Average---------Haugh units-	77.81	80.51
Range group 1----------	83.30 - 80.55	84.30 - 82.40
Range group 2----------	80.54 - 77.81	82.39 - 80.51
Range group 3----------	77.80 - 77.50	80.50 - 79.10
Range group 4----------	77.49 - 75.10	79.09 - 77.70
Blood spots, all sizes;		
Average----------percent-	2.46	2.65
Range group 1----------	.70 - 1.58	1.10 - 1.87
Range group 2----------	1.59 - 2.46	1.88 - 2.65
Range group 3----------	2.47 - 3.83	2.66 - 4.32
Range group 4----------	3.84 - 5.20	4.33 - 6.00

TABLE 5.--Range group ranking for stock entered in 1976-77 random sample egg production tests

ENTRY IOENTIFICATION	TEST	BREEDING	STRAIN OR TRAOENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (Hen housed) (No.)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Animal Research Institute, Central Experimental Farm, Ottawa, Ontario, Canada K1A OC6.													
A.R.I., Ont.----------	CC	WL PS	Kentville, R.B.C.--	4	4	3	3	1	4	4	4	4	4
Anthony, George M. & Sons, Strausstown, Pennsylvania 19559.													
Anthony, PA----------	PA	WL SX	Anthony-76---------	2	2	1	1	4	3	2	2	3	4
Babcock Poultry Farm, Inc., P.O. Box 280, Ithaca, New York 14850.													
Babcock, NY----------	CC	WL IN	Babcock B-300 F----	3	4	3	1	4	2	2	3	4	1
Babcock, NY----------	NH-C	WL IN	Babcock B-300 F----	3	3	2	1	3	3	3	2	4	4
Babcock, NY (Harrold's, GA)----------	NC	WL IN	Babcock B-300 F----	1	2	1	4	2	4	4	2	4	1
Babcock, NY----------	PA	WL IN	Babcock B-300 F----	2	2	1	1	3	3	3	3	4	2
Babcock Poultry Farm, Inc., P.O. Box 280, Ithaca, New York 14850.													
Babcock, NY----------	CC	WL IN	Babcock B-300 V----	1	2	2	2	2	1	1	1	3	1
Babcock, NY----------	FL	WL IN	Babcock B-300 V----	--	1	2	1	1	3	2	2	4	1
Babcock, NY----------	NH-C	WL IN	Babcock B-300 V----	1	2	2	1	3	3	3	1	3	1
Babcock, NY----------	PA	WL IN	Babcock B-300 V----	1	1	1	1	1	3	2	1	2	2
Babcock Poultry Farm, Inc., P.O. Box 280, Ithaca, New York 14850.													
Babcock, NY----------	NH-C	RIRxSYN BX	Babcock B-380------	2	1	2	2	1	1	1	3	4	1
Babcock, NY----------	NC	RIRxSYN BX	Babcock B-380------	4	2	3	3	3	1	1	3	4	3
Babcock, NY----------	PA	RIRxSYN BX	Babcock B-380------	3	2	3	1	1	1	1	3	3	2
Canada Department of Agriculture, Poultry Division, 510 Sir John Carling Bldg., Ottawa, Ontario, Canada K1A OC5.													
Canada D.A., Ont.----------	CC	WL SYN	P.D. 58----------	3	2	3	4	2	4	4	2	1	1
Carey Farms, 3252 Mt. Olive-Agosta Rd., Marion, Ohio 43302.													
Carey, OH----------	FL	WL IN	Carey Nick 310-----	--	2	4	1	4	4	3	3	3	1
Carey, OH----------	NH-C	WL IN	Carey Nick 310-----	2	1	4	1	1	4	4	2	2	1
Carey, OH----------	PA	WL IN	Carey Nick 310-----	2	2	4	2	2	3	3	3	3	2
Colonial Poultry Farm, Inc., Pleasant Hill, Missouri 64080.													
Colonial, MO----------	PA	RIRxWPR BX	True-Line SL 250---	4	4	4	1	1	2	2	4	2	4
Colonial Poultry Farm, Inc., Pleasant Hill, Missouri 64080.													
Colonial, MO----------	CC	WL IN	True-Line 365 S----	3	3	3	2	3	4	4	1	4	2
Colonial, MO----------	FL	WL IN	True-Line 365 S----	--	3	1	1	1	4	4	1	4	2
Colonial, MO----------	PA	WL IN	True-Line 365 S----	1	2	1	2	1	4	4	1	4	1

TABLE 5.--Range group ranking for stock entered in 1976-77 random sample egg production tests--continued

ENTRY IDENTIFICATION	TEST	BREEDING	STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (Hen housed) (No.)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
DeKalb-Warren, Inc., 229 Main St., North Brookfield, Massachusetts 15350.													
DeKalb-Warren, MA----------	NH-C	SYNxRIR BX	DeKalb Amber Link-	1	1	2	2	1	2	1	2	2	1
DeKalb-Warren, MA----------	NH-F	SYNxRIR BX	DeKalb Amber Link-	2	2	4	4	3	3	2	3	2	1
DeKalb, IL (Hillcrest, GA)----------	NC	SYNxRIR BX	DeKalb Amber Link-	3	1	4	1	1	2	1	4	1	4
DeKalb, IL----------	PA	SYNxRIR BX	DeKalb Amber Link-	3	3	4	1	3	2	2	3	1	2
DeKalb-Warren, Inc., 229 Main St., North Brookfield, Massachusetts 15350.													
DeKalb-Warren, MA----------	NH-C	RIRxRIW BX	Sex Sal Link F----	1	2	3	2	1	1	1	2	3	1
DeKalb-Warren, MA----------	PA	RIRxRIW BX	Sex Sal Link F----	4	3	4	2	1	1	1	3	1	1
DeKalb AgResearch, Inc., Sycamore Rd., DeKalb, Illinois 60115.													
DeKalb, IL----------	CC	-- INX	DeKalb X-L Link---	1	1	3	1	3	3	3	1	2	1
DeKalb, IL----------	FL	-- INX	DeKalb X-L Link---	--	1	2	3	1	2	2	2	1	2
DeKalb, IL----------	NH-C	-- INX	DeKalb X-L Link---	2	1	2	2	2	3	3	1	1	1
DeKalb, IL (Hillcrest, GA)----------	NC	-- INX	DeKalb X-L Link---	3	3	2	4	3	3	3	2	2	2
DeKalb, IL----------	PA	-- INX	DeKalb X-L Link---	1	1	2	2	1	3	2	2	3	2
Euribrid, B.V., P.O. Box 30, Boxmeer, Holland													
Euribrid-Pilch, NC----------	CC	WL SX	Hisex White-------	1	1	4	4	1	3	3	2	4	3
Euribrid-Pilch, NC----------	FL	WL SX	Hisex White-------	--	1	1	2	2	3	3	2	4	3
Euribrid-Pilch, NC----------	NH-C	WL SX	Hisex White-------	1	1	1	1	2	3	3	1	3	4
Euribrid-Pilch, NC----------	NH-F	WL SX	Hisex White-------	1	1	1	1	2	4	4	1	4	1
Euribrid-Pilch, NC (Chicks of Dixie, GA)------	NC	WL SX	Hisex White-------	2	1	1	1	2	4	4	2	4	2
Euribrid-Pilch, NC----------	PA	WL SX	Hisex White-------	1	1	1	3	3	3	2	1	4	3
Fisher Poultry Farm, Ltd., Ayton, Ontario, Canada NOG 1CO.													
Fisher, Ont.----------	CC	WL SX	Fisher 107--------	2	2	1	2	1	2	1	2	1	1
Hardy, C. Nelson & Son, Essex, Massachusetts 01929.													
Hardy, MA----------	NH-C	-- BX	Hardy Concord-----	2	2	3	1	2	3	2	3	3	1
Hardy, C. Nelson & Son, Essex, Massachusetts 01929.													
Hardy, MA----------	NH-C	RIRxBPR BX	Deluxe Sex Link---	3	3	4	1	3	1	1	3	3	1
Harmen Pedigree, P.O. Box 277, West Groton, Massachusetts 01472.													
Harmen, MA----------	NH-C	-- BX	Golden Link-------	2	2	2	2	2	3	2	3	4	1
Harmen Pedigree, P.O. Box 277, West Groton, Massachusetts 01472.													
Harmen, MA----------	NH-C	-- BX	Sex Link----------	2	3	4	1	3	1	1	3	2	4

TABLE 5.--Range group ranking for stock entered in 1976-77 random sample egg production tests--continued

ENTRY IDENTIFICATION	TEST	BREEDING		STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (Hen housed) (No.)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Hubbard Farms, Inc., Walpole, New Hampshire 03608.														
Hubbard, NH	NH-C	SYNxNH	BX	Golden Comet	1	1	1	4	1	2	2	2	3	1
Hubbard, NH (Hubbard, NC)	NC	SYNxNH	BX	Golden Comet	4	4	4	3	4	1	1	4	3	4
Hubbard, NH	PA	SYNxNH	BX	Golden Comet	3	3	3	1	3	2	3	3	1	3
Hubbard Farms, Inc., Walpole, New Hampshire 03608.														
Hubbard, NH	CC	WL	SX	Hubbard Leghorn	3	3	2	1	3	3	3	3	3	3
Hubbard, NH	FL	WL	SX	Hubbard Leghorn	--	2	2	2	3	2	2	2	2	3
Hubbard, NH	NH-C	WL	SX	Hubbard Leghorn	2	1	2	3	3	4	4	2	2	3
Hubbard, NH	PA	WL	SX	Hubbard Leghorn	2	2	1	3	3	3	3	2	3	4
Ideal Poultry Breeding Farms, P.O. Box 591, Cameron, Texas 76520.														
Ideal, TX	FL	SYNxWL	BX	Ideal 236	--	3	4	3	3	2	1	2	4	2
Ideal, TX	PA	SYNxWL	BX	Ideal 236	2	2	3	3	1	3	3	2	3	2
Indiana Farm Bureau Coop., 2435 Kentucky Ave., Indianapolis, Indiana 46241.														
Indiana Farm Bureau, IN	PA	WL	SX	Duchess 60	1	1	2	4	3	4	4	2	1	2
Parks Poultry Farm, Route 4, Box 118, Altoona, Pennsylvania 16601.														
Parks, PA	FL	WL	SX	Keystone B-1	--	3	2	2	4	3	3	3	4	3
Parks, PA	NH-C	WL	SX	Keystone B-1	4	4	4	4	4	4	4	2	3	4
Parks, PA	PA	WL	SX	Keystone B-1	2	2	1	3	3	3	3	1	4	2
Parks Poultry Farm, Route 4, Box 118, Altoona, Pennsylvania 16601.														
Parks, PA	NH-F	RIRxWPR	BX	Sil-Go-Links	4	4	4	4	4	3	4	4	1	1
Parks, PA	PA	RIRxWPR	BX	Sil-Go-Links	3	3	4	3	2	1	2	3	2	1
Shaver Poultry Breeding Farms, Ltd., Box 400, Cambridge, Ontario, Canada N1R 5V9.														
Shaver, Ont.	CC	WL	SX	Starcross 288	1	1	1	2	1	1	1	2	2	2
Shaver, Ont.	FL	WL	SX	Starcross 288	--	1	2	4	1	1	1	1	1	1
Shaver, Ont.	NH-C	WL	SX	Starcross 288	1	1	1	4	2	2	2	1	1	1
Shaver, Ont.	NH-F	WL	SX	Starcross 288	1	1	2	1	1	2	2	1	4	1
Shaver, Ont. (Delta, FL)	NC	WL	SX	Starcross 288	2	1	2	2	1	2	1	2	2	2
Shaver, Ont.	PA	WL	SX	Starcross 288	1	1	3	2	2	2	1	1	3	3
Shaver Poultry Breeding Farms, Ltd., Box 400, Cambridge, Ontario, Canada N1R 5V9.														
Shaver, Ont.	NH-F	RIR	SX	Starcross 579	1	2	2	4	1	1	1	1	1	4
Shaver, Ont.	PA	RIR	SX	Starcross 579	4	4	3	1	2	1	1	3	2	3

TABLE 5.--Range group ranking for stock entered in 1976-77 random sample egg production tests--continued

ENTRY IDENTIFICATION	TEST	BREEDING		STRAIN OR TRADENAME	INCOME OVER FEED AND CHICK COST ($)	EGG PRODUCTION (Hen housed) (No.)	AGE AT 50% PRODUCTION (Days)	GROWING MORTALITY (%)	LAYING MORTALITY (%)	EGG WEIGHT (oz)	LARGE AND EXTRA LARGE EGGS (%)	FEED PER POUND OF EGGS (lbs)	ALBUMEN QUALITY (H.U.)	BLOOD SPOTS (%)
Tatum Farms, Route 3, Dawsonville, Georgia 30534.														
Tatum, GA----------	FL	WL	SX	Tatum T-100-------	--	4	3	1	4	2	2	3	1	4
Tatum, GA----------	NH-C	WL	SX	Tatum T-100-------	4	4	2	1	4	3	3	3	1	1
Tatum, GA----------	PA	WL	SX	Tatum T-100-------	3	3	3	2	3	3	3	3	2	3
Tatum Farms, Route 3, Dawsonville, Georgia 30534.														
Tatum, GA----------	NH-C	RIRxSYN	BX	Tatum T-173-------	3	3	4	3	1	3	3	3	2	1
Tatum, GA----------	PA	RIRxSYN	BX	Tatum T-173-------	4	4	4	1	2	2	2	3	3	1
Welp's Poultry Breeding Farm, Box 366, Bancroft, Iowa 50517.														
Welp, IA----------	NH-C	RIR	SX	Welp Line 650 N---	4	3	2	2	3	3	3	4	4	1
Welp's Poultry Breeding Farm, Box 366, Bancroft, Iowa 50517.														
Welp, IA----------	FL	WL	SX	Welp Line 975-----	--	4	2	2	4	4	4	3	3	3
Welp, IA----------	NH-C	WL	SX	Welp Line 975-----	4	4	2	4	3	4	4	3	4	1

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